Earth's Structure and Processes

8-3 The student will demonstrate an understanding of materials that determine the structure of Earth and the processes that have altered this structure. (Earth Science)

8.3.5 Summarize the importance of minerals, ores, and fossil fuels as Earth resources on the basis of their physical and chemical properties.
Taxonomy level: 2.4-B Understand Conceptual Knowledge

Previous/future knowledge: In 3rd grade (3-3.2), students identified common minerals based on their properties; they also gave examples of how Earth materials were used (3-3.7). In 7th grade (7-4.6), Earth resources were classified as renewable or nonrenewable. Understanding the importance of minerals, ores, and fossil fuels based on their properties is new to this grade; ores have never been introduced.

It is essential for students to know that Earth resources (minerals, ores, and fossil fuels) have properties that make them important and useful. Properties that determine the usefulness of an ore or mineral may be identified using a chart, diagram or dichotomous key. The two types of properties are:

- *Physical properties*; for example, hardness, luster, color, texture, the way a mineral splits, or density
- *Chemical properties*; for example, the ability to burn, the reactivity to acids

Three common Earth resources that have importance based on their properties are:

Minerals

- Natural, solid materials found on Earth that are the building blocks of rock; each has a certain chemical makeup and set of properties that determine their use and value.

Ores

- Minerals that are mined because they contain useful metals or nonmetals.

Fossil fuels

- Natural fuels that come from the remains of living things; fuels give off energy when they are burned.

It is not essential for students to classify individual minerals for the purpose of identification, but understanding the meaning of the physical properties by examining some common minerals would be helpful.

Assessment Guidelines:
The objective of this indicator is to *summarize* the importance of certain Earth resources; therefore, the primary focus of assessment should be to generalize major points about the importance of minerals, ores, and fossil fuels because of their physical and chemical properties. However, appropriate assessments should also require students to *interpret* a chart of important/useful Earth resources; *exemplify* Earth resources that are minerals, ores, or fossil fuels; or *identify* properties that would make an Earth resource important.